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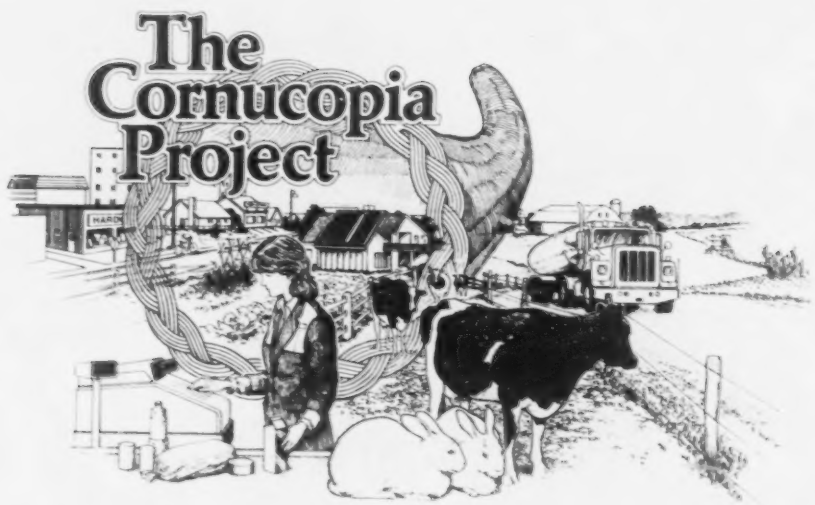


THE PENNSYLVANIA FOOD SYSTEM: CRASH OR SELF-RELIANCE?

A study of the food system of Pennsylvania by

The Cornucopia Project of Rodale Press
33 East Minor Street
Emmaus, Pennsylvania 18049
Phone: (215) 967-5171

Introduction

Pennsylvania is the most productive agricultural state in the Northeast. It is blessed with fertile farmlands, abundant forests, huge reserves of coal. Even the name--Penn's Woods--brings to mind the image of a rich, fruitful land.

If that sounds a bit promotional, we make no apology. Pennsylvania is our home, and we like it here. It seemed only natural that when The Cornucopia Project wanted to study the food system of a particular state, we would begin with our own.

As citizens of Pennsylvania, what we discovered about our state's food system has made us deeply concerned.

*Over 70 percent of the food we eat is produced outside the state.

*We spend $8.4 billion every year on food from outside the state; transportation alone costs us over $400 million.

*In the last 30 years, we have lost 61 percent of our farms; in another 30 years we may not have any farms.

*Every year we lose 164 square miles of agricultural land to erosion and development; every 8 months we lose an area the size of Pittsburgh to development; every year we lose enough topsoil to bury Harrisburg under 5½ feet of soil. At this rate, our entire agricultural productivity will be destroyed in about 70 years.

These problems are compounded by the fact that what is happening in Pennsylvania is happening across America. Every day, while the U.S. population grows by 5,000, the nation loses the productive equivalent of 25 square miles of agricultural land to erosion and farmland development. Repeated, heavy applications of chemicals and continuous single-cropping are destroying the fertility of our soil. The supply of fertilizer minerals is rapidly depleting.

Our entire food system is powered by non-renewable fuels. Processing, packaging and transporting food use 60 percent more energy than all the farms that produce our food.[1] Dependence on long-distance food transport makes supplies tenuous in many areas. Farm debts are at record levels and rising astronomically; they've shot up 650 percent in the last 20 years.[2] Irrigated farmlands in the West, which produce a large share of the nation's foodstuffs, are threatened by declining water tables and increasing salt build-up. Last year's drought caused major losses in our corn, soybean, sorghum and peanut crops, and more severe weather patterns are predicted.

Seen in this context, the hard facts about Pennsylvania's food supply lead to an inescapable conclusion: our system is vulnerable. An energy cutback, a transportation strike, a freeze, drought or labor dispute in California--any of these could mean a food crisis. Our method of producing food is wearing away our state's productive capabilities. In earlier times, a food system that consumed resources so heavily seemed to make sense. In today's world, it certainly does not.

But the situation is far from hopeless. Pennsylvania has the resources, both in land and people, to change this dangerous position. We can preserve our farms and farmland, increase our self-reliance, and develop a secure food supply, if we act now. The purpose of this report is to help us begin to do that.

The frightening facts

Pennsylvania's food system is in trouble. The biggest danger is that the situation may become critical before it even seems serious.

That may seem like a strange thing to say about the leading agricultural state in the Northeast. Pennsylvania has over 61,000 farms, and 7.4 million acres of cropland and pasture, of which 4.4 million acres are prime cropland, the most productive type of land in the country.[1,2] Pennsylvania agriculture generates over $2.5 billion in farm receipts, and supports a $20 billion a year agribusiness economy which employs more than 900,000 people.[3] It leads the U.S. in the production of mushrooms, cigar-leaf tobacco, sausage, scrapple, pretzels, potato chips, and quality-graded eggs. It ranks near the top in the production of milk, cottage cheese, ice cream and frozen dairy products, sweet corn, sour cherries, apples, peaches, grapes, grape juice, wine and maple syrup.[2,4]

Despite this abundance, Pennsylvania imports over 70 percent of its food.[5] Every week, more than 6,500 truckloads of food from such distant places as California, Arizona and Florida come rolling into the state to keep us from going hungry.[6] Among these imports are 99 percent of our lettuce, 96 percent of our broccoli, 88 percent of our carrots, 76 percent of our strawberries, 77 percent of our beef, 82 percent of our pork, and 60 percent of our potatoes.

Since most of our food comes from faraway places, that's where our food dollars go. Pennsylvanians spent nearly $12 billion for food in 1980--$1,023 for every child, woman and man in the state.[8] Of this amount, $8.4 billion was paid for food produced outside Pennsylvania.[9] About $18.4 million leaves the state <u>each day</u> to pay for our imported foodstuffs.

But these figures on food imports and dollar exports do not tell the full story. The number of farms in Pennsylvania is decreasing rapidly. Since 1970 we have lost more than 17 percent of our farms; since 1960, over 46 percent; and in the 30 years since 1950, over 60 percent.[10] If this trend continues, in the year 2004 (23 years from now) our children and grandchildren may never know what a real farm looks like.

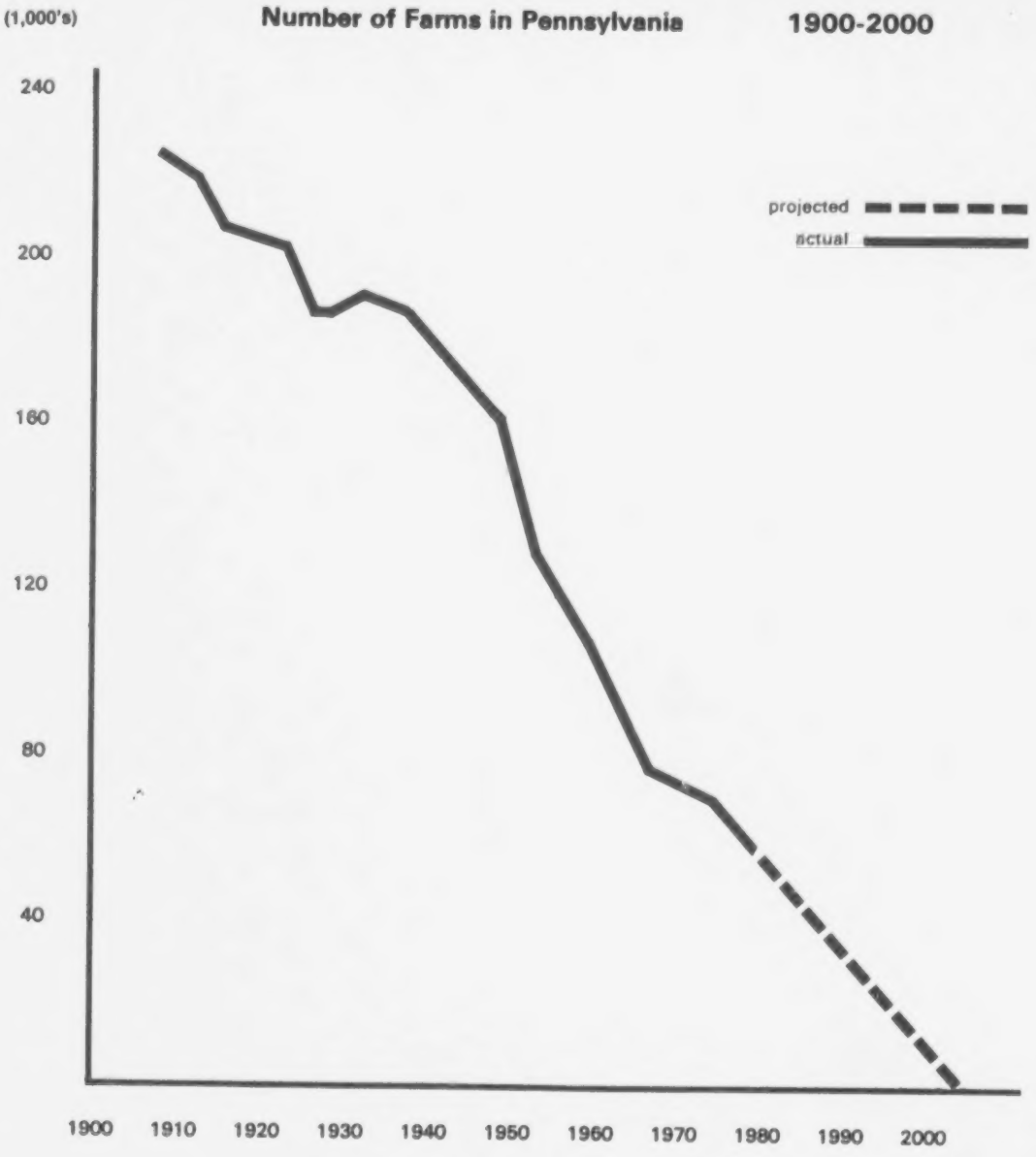
Part of the reason for the decrease in the number of farms is the increase in size. In the last 30 years, the average farm in Pennsylvania has grown by over 60 percent.[10] (See chart 2.) This means that power over our food system is being concentrated in fewer and fewer hands. A system dependent on large farms is less flexible or adaptable in times of stress than one composed of many small farms. And these large farms are less efficient than smaller ones.[11]

A more important reason for the disappearance of our farms is the amount of land lost to development. Each year 81 square miles (52,000 acres)[1] of agricultural land are built on or paved over; an area the size of Pittsburgh is lost every eight months!

Soil erosion is equally destructive to farmland. Pennsylvania annually loses 50.7 million tons of soil to sheet and rill erosion[1]--enough to cover the entire city of Harrisburg with nearly 5½ feet of topsoil each year. Erosion is always troubling, but intensive chemical farming, with continuous planting of row crops and use of heavy equipment that compacts the soil, makes it even worse. Measured in terms of acres lost, the soil eroded in Pennsylvania would come to over 50,000 acres annually.[12]

Taken together, development and erosion cause the loss of about 164 square miles of agricultural productivity in Pennsylvania each year. At this rate, we will lose the state's entire agricultural productivity in a little over 70 years. And if the amount of land being farmed continues to decline as it has since 1950, Pennsylvania will have no farms by the year 2030--a mere 50 years away. (See chart 3.)

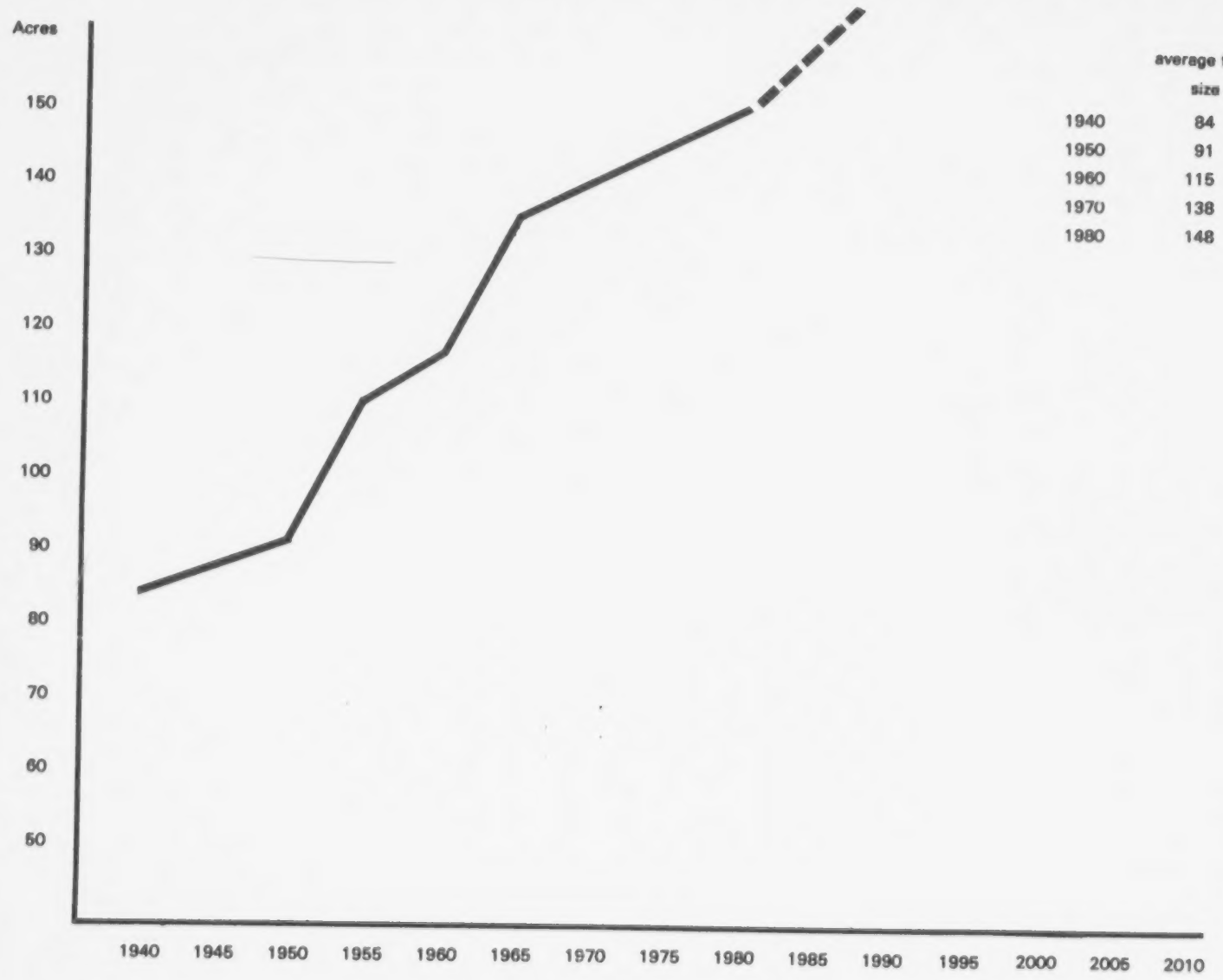
Chart 1



Source: Pa. Crop Reporting Service

Chart 2

Average Size of Farms, Pennsylvania 1940-1980

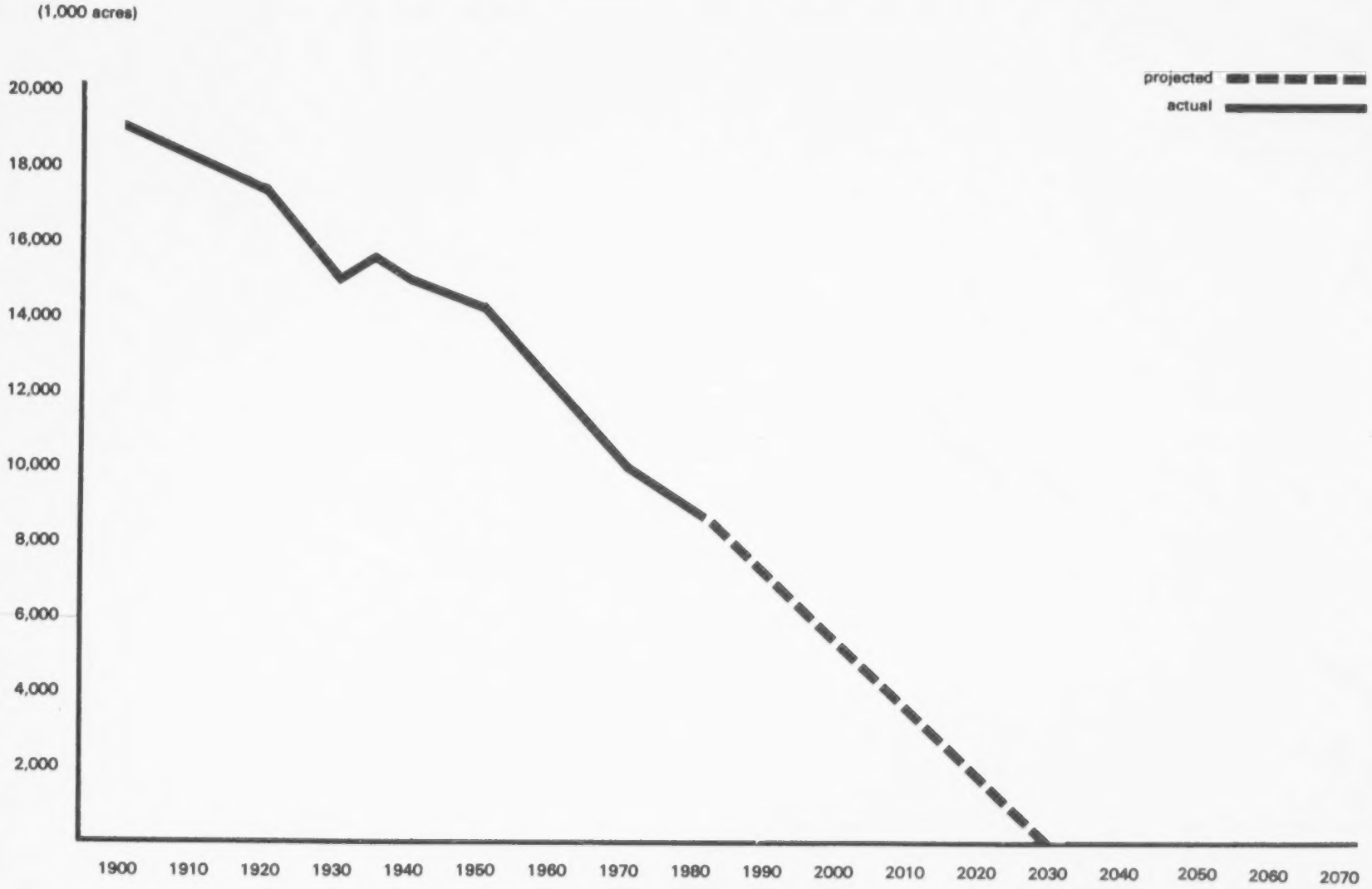


	average farm size
1940	84
1950	91
1960	115
1970	138
1980	148

Source: Pa. Crop Reporting Service

Chart 3

Land in Farms, Pennsylvania 1900-2070



Sources: Historical Statistics of the U.S.
Pa. Crop Reporting Service

Besides endangering our future, this destruction of soil exacts a heavy price in the present. Each foot of eroded soil can store about two inches of water for crops, and an acre-foot contains about 8,000 pounds of nitrogen and 2,000 pounds of phosphorus.[13] So through erosion, Pennsylvania loses nearly 200 million pounds of nitrogen and 52.8 million pounds of phosphorus each year. At current prices, this represents an annual loss of over $75 million in just these fertilizer minerals--about 22 percent of Pennsylvania's fertilizer consumption for 1979. And this does not include the value of the 1.43 billion gallons of water storage capacity lost or the long-term decrease in the productivity of the soil.

What do these facts mean?

This situation represents much more than some unusual numbers. Together, these numbers add up to some disturbing news for anyone in Pennsylvania who eats.

1) Our food supply is vulnerable. Because we depend on outside producers for most of our food, our supply is highly uncertain. An oil embargo or energy shortage, a labor dispute, a drought or crop failure in Florida or California--any of these could lead to serious shortages. A California Department of Agriculture study indicated that "California's enviable position in agricultural productivity has been built upon relatively inexpensive energy inputs and available supplies," and that "most of California's best farmland lies within counties designated as Standard Metropolitan Statistical Areas."[14] The radically changed world of expensive energy, the loss of farmland to development, and California's increasing population could lead to a situation around the year 2000 where California had little or no food to export. We must have food to live, and we currently get most of it from sources which we do not control.

If any disruption in our food supply occurred, perishables would disappear from the stores almost immediately, according to a spokesman for the Pennsylvania Grocers Association. With normal buying patterns, stores over 10,000 square feet might have canned goods for as long as a week; smaller stores without storage space would be empty sooner. If, however, people knew that a shortage was likely, a "food panic" would empty all the stores in less than a day.

Such scenarios are not mere fantasy; we've already had a taste of what they might be like. During the last oil shortage, grocery warehouses were out of almost 20 percent of all food items.[15] Because of inflation and the cost of money, grocery store, warehouse and food processor back-up inventories are even lower than usual. Winter storm warnings often cause local stores to empty out. If something similar happened on a state-wide scale, many of us would soon be hungry, and we wouldn't last long on the surplus supplies of ice cream, mushrooms and pretzels produced in the state. If a supply disruption lasted long enough, social order in food-short urban areas could even break down. A serious food shortage in a city could have an effect analogous to the yelling of "fire" in a crowded theatre.

2) Our food is more expensive and less tasty. Because we import most of our food, we have to pay the transportation costs. The bill comes to about $400 million a year, with over $40 million paying just for fresh vegetables.[16] That's over $1.2 million <u>per day</u> just for transportation costs that have to be paid by the Pennsylvania consumer. In addition, food that has to travel cross-country must be picked before it is fully ripe, so both its flavor and nutritional value suffer. In short, we end up paying more for food of lesser quality, while simultaneously hurting local farmers and the rest of Pennsylvania's economy.

Dependence on distant food also means drastic price rises if any problems occur. A study by the U.S. Department of Energy last year concluded that an energy shortage or reduction of 10 percent would lead to an increase of 55 percent in the price of fresh fruits and vegetables.[17] Our food prices are certain to rise as energy cost goes up and supply goes down.

3) Our local economy is weakened. Keeping more of our food dollars here would strengthen Pennsylvania. An economically healthy farming sector increases the strength of the whole region, since every dollar spent by a farmer generates another $2.20 in local business.[2] Instead of sending $6.7 billion (approximately 20 percent of the total 8.4 billion remains with Pennsylvania retailers) to agribusinesses in California and Florida, if our money went to Pennsylvania farmers, it would be spent locally or put in local banks. So if, for example, we produced all our food within the state, an additional $14.7 billion worth of local business would be generated.

What can we do?

The good news is that there are several things we can do to change this situation. Pennsylvania can produce much more of its food. A good place to begin might be with vegetables.

In Pennsylvania, we currently import over 80 percent of our fresh vegetables. (See Chart 4.) To produce all our vegetables within the state would require about 335,000 acres--4.5 percent of our total farmland.[18] Pennsylvania has the climate, soil types, and land to be totally self-reliant in vegetable crops.*

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*This takes into account the fact that certain types of vegetables thrive in specific soils. For example, onions prefer sandy loam or muck types of soil. To produce all the onions we consume in Pennsylvania we would need 4,579 acres of this kind of soil. We have over 266,000 acres,[19] yet we import 95 percent of our onions.

Chart #4 Amounts and costs of vegetables imported into Pennsylvania

FOOD PRODUCT	AMOUNT CONSUMED IN PENNSYLVANIA[1] (1,000 lbs.)	AMOUNT IMPORTED[2]	AMOUNT LEAVING PENNSYLVANIA[3] (wholesale cost)	TRANSPORTATION COST[4]
Potatoes	1,478,106.0	59.4%	$ 51,438,090	$11,215,769
Lettuce	315,563.9	93.9%	54,222,698	14,363,439
Tomatoes	157,195.4	82.0%	51,560,088	3,506,729
Onions	124,348.6	95.0%	11,813,115	2,683,994
Cabbage	104,405.9	50.0%	5,220,295	691,120
Snap Beans	16,423.4	80.0%	4,817,531	271,290
Celery	78,597.7	87.7%	10,339,526	2,702,488
Cucumbers	49,270.2	88.8%	10,937,976	973,590
Carrots	68,039.8	88.1%	9,590,880	2,238,080
Sweet Potatoes	64,520.5	99.3%	8,400,000	384,200
Broccoli	15,250.3	58.0%	3,186,000	811,172
TOTALS	2,471,721.7	80.2%[5]	$221,526,199	$39,841,871

[1]These figures do not include consumption of food from home gardens.

[2]Obtained by dividing production by consumption weight and subtracting from 100%.

[3]Wholesale prices from Philadelphia Fresh Fruit and Vegetable Market Prices, 1979.

[4]Transportation costs do not include 100% of imported commodity, so they are a low estimate. Origins of produce were derived from Fresh Fruit and Vegetable Unloads in Eastern Cities, 1979. Philadelphia and Pittsburgh were used as representative of the origins of all produce coming into the state. Unloads are not recorded in any other Pennsylvania cities. The cost also represents only truck transportation. Costs are $1/mile. (American Trucking Trends, 1977-1978.)

[5]Average amount imported.

Self-reliance in vegetables would not necessarily require large changes in our diet. Using such methods as indoor propagation and transplanting, we could have a fresh supply of most vegetables for at least six months. Some crops--including carrots, potatoes, onions, beets, cabbage, turnips and squash-- keep well in cold storage and could be available in their fresh form nearly all year. (See chart 5.) Our 300-plus acres of greenhouses could produce part of our out-of-season vegetable needs. And since 30 percent of our present vegetable consumption is in the form of frozen (5.3 percent) or canned (25 percent) vegetables,[21] we could easily grow and preserve these in Pennsylvania.

It would also be possible to grow all our own vegetables without cutting back on any other crops. There are more than enough acres of good farmland now used for other purposes (designated "occasionally improved hayland") to do this.[22] What is perhaps needed more than anything to bring about this change are local markets so our farmers can be sure of selling their produce for a fair profit.

The evidence is clear that programs for growing and marketing produce locally benefit both the farmer and the consumer. The food is tastier and fresher, and far less energy is consumed in getting it to the table. United States Department of Agriculture studies of direct markets in Colorado showed that local farmers received 44 percent higher gross returns than if they had sold through wholesale channels, while consumers got an average 28 percent discount compared to supermarket prices.[23] A New York City study showed price savings ranging from 7 to 35 percent.

Chart #5 20

VEGETABLES FOR STORAGE

Beets. Pick mature vegetables before first killing frost. Pack in layers of damp sawdust or sand. Requirements: 32 to 40°F., 90 to 95 percent humidity. Life: 4 to 6 months.

Brussels sprouts. Harvest after a few mild frosts. Store in perforated plastic bags. Requirements: 32 to 40° F., 90 to 95 percent humidity. Life: 3 to 5 weeks.

Cabbage. Pick firm, solid heads, and trim off loose outer leaves. Place heads on shelves, string them up by the roots, or wrap in newspaper and store in boxes or bins. (Beware: cabbage emits a strong odor during storage.) Requirements: 32 to 40°F., 80 to 90 percent humidity. Life: 2 to 4 months.

Cabbage, Chinese. Store only mature, solid heads, picked before a severe frost. Store as with regular cabbage, or pack roots in damp soil or sand. Requirements: 32 to 40°F., 90 to 95 percent humidity. Life: 2 to 4 months.

Carrots. Dig before any hard freezes. Store in cartons of sawdust, sand, or leaves. Requirements: 32 to 40°F., 90 to 95 percent humidity. Life: 6 to 8 months.

Celery. Store in trenches in the garden, or place roots in boxes of sand or soil. Requirements: 32 to 40°F., 90 to 95 percent humidity. Life: 1 to 2 months.

Endive, escarole. Pick after moderate fall frosts. Store with roots in soil or sand. Requirements: 32 to 40°F., 80 to 90 percent humidity. Life: 2 to 3 months.

Garlic. After curing, store in paper bags, or braid into strings and hang from rafters. Requirements: 35 to 40°F., 60 to 70 percent humidity. Life: 6 to 8 months.

Horseradish. Dig anytime in fall. Store in damp sand or sawdust. Requirements: 32 to 40°F., 90 to 95 percent humidity. Life: 4 to 6 months.

Jerusalem artichokes. Mulch in garden or store in plastic bags or damp sand. Requirements: 32 to 40°F., 90 to 95 percent humidity. Life: 1 to 2 months.

Kohlrabi. Remove leaves and roots. Store in damp sand or sawdust. Requirements: 32 to 40°F., 90 to 95 percent humidity. Life: 2 to 3 months.

Onions. After curing, remove tops and store in bins or string bags, or braid and hang from rafters. Requirements: 35 to 40°F., 60 to 70 percent humidity. Life: 4 to 6 months.

Parsnips. Mulch in ground or store in damp sawdust, sand, or leaves. Requirements: 32 to 40°F., 90 to 95 percent humidity. Life: 4 to 6 months.

Potatoes, sweet. After curing, wrap individually in newspaper and pack in baskets, or pack loosely (make sure potatoes aren't touching) in cartons of sawdust. Requirements: 50 to 60°F., 60 to 70 percent humidity. Life: 3 to 5 months.

Potatoes, white. Late potatoes store best. After curing, pack in baskets or boxes. Don't store near apples, which give off a gas that promotes sprouting. Requirements: 32 to 40°F., 80 to 90 percent humidity. Life: 4 to 6 months.

Pumpkins. After curing, place on shelves or in boxes. Requirements: 50 to 60°F., 60 to 70 percent humidity. Life: 4 to 6 months.

Rutabagas. Dig after a few mild frosts. Store in damp sand, sawdust, or moss. Requirements: 32 to 40°F., 90 to 95 percent humidity. Life: 2 to 4 months.

Salsify. Mulch in garden, or store like parsnips. Requirements: 32 to 40°F., 90 to 95 percent humidity. Life: 1 to 2 months.

Squash, winter. After curing, pack on shelves or in boxes. Requirements: 50 to 60°F., 60 to 70 percent humidity. Life: 4 to 6 months.

Tomatoes, green. Pick mature green fruits before frost. They will gradually ripen at 55 to 70°F. Requirements: 50 to 60°F., 60 to 70 percent humidity. Life: 4 to 6 weeks.

Turnips. Harvest before a heavy freeze. Store like carrots. Requirements: 32 to 40°F., 90 to 95 percent humidity. Life: 2 to 4 months.

Another approach to increasing our food self-reliance is expanding the role of home gardens. Approximately 40 percent of the households in Pennsylvania have gardens, and these produce more than one-third of the vegetables we eat now.[24] If each of these 1.7 million gardens[25] produced 1,100 pounds of vegetables, they could provide all of Pennsylvania's vegetable needs. If each present gardener produced 770 pounds of vegetables, all of Pennsylvania's fresh vegetable needs could be provided. (These are not outrageous figures; many gardens produce far more than this.) Or if all Pennsylvania's households had gardens that produced 445 pounds of food (the average U.S. garden in 1979 produced 545 pounds)[24] all the state's vegetable needs could be met. This won't happen, of course, but it helps show the significant contribution home gardens already make to the state's food supply, self-reliance and economy, and that there are even greater possibilities.

We could also strengthen the Pennsylvania food system by increasing local fertilizer production. Last year, we used 580,720 tons of fertilizer, most of it from out of state.[26] But each year the livestock, poultry and humans in Pennsylvania produce more nitrogen, phosphates, and potash fertilizer than is needed by Pennsylvania farmers,[27] and much of this could be converted into usable commercial products.

Could Pennsylvania have a totally self-sufficient food system? Not with our present diet. We cannot grow such things as oranges, bananas, rice, sugar, peanuts, coffee, tea and cocoa. We do not have the land necessary to produce all the meat we eat. And it is questionable whether complete self-sufficiency is a worthwhile goal in itself. Perhaps moves to increase self-sufficiency should be based not on the goal of self-sufficiency, but on goals of reducing food costs, averting the risk of supply unavailability when that risk is unacceptable, and increasing the economic viability of Pennsylvania.

But given the vulnerability of our food supply, and the economic and nutritional advantages to Pennsylvania of eating locally produced food, it is clearly desirable for Pennsylvania to increase its self-reliance. In the event of outside problems we would then be more certain of an adequate food supply. It would not be difficult for us to produce all our vegetables--either commercially or in home gardens. And with the continuation of certain trends of change in our food consumption patterns we could greatly increase our self-reliance. For example, annual beef consumption has dropped in the last 5 years from 120 pounds per person to 106 pounds.[28] It is not hard to see why beef is so expensive in Pennsylvania--given that we import over 77 percent of it, and that producing beef is very energy intensive. What other foodstuffs will follow in the economic footsteps of beef? What other foods will Pennsylvanians no longer be able to afford?

To meet all our food needs--with the exception of beef and items which cannot be grown here--would take approximately 4.6 million acres,[29] about 60 percent of our total cropland. Just to produce all our beef locally would require about 9 million acres, 20 percent more farmland than the state has.[30] (Beef production requires huge amounts of space, both for pasture land and for cropland to raise feed grains.) But if we (1) took the land left after meeting all our other food needs, and (2) grew beef on most of it, and (3) cut our consumption by 80 percent (this would mean about 24 pounds per person yearly), and (4) substituted wheat, potatoes and beans, Pennsylvania could be almost totally self-reliant.

That chain of events is unlikely to happen. Most of us like our steaks and hamburgers too well. It is unlikely, though, that such a move would have a severe impact on Pennsylvania's meat producers, who currently grow about 22 percent of our beef. In addition, such a diet would provide more than enough protein, and shows one way we could cope with a serious food emergency.

There are other options as well. Poultry converts feed into meat much more efficiently than cows; it takes 10 times as much space to produce a pound of beef as it does to produce a pound of chicken.[31] So if we cut our consumption of red meat, and ate more drumsticks, we would free additional farmland for other crops. Livestock have an essential part to play in our food production cycle, but we must make sure they fit in appropriately, and that they support, not weaken, the system.

RECOMMENDATIONS FOR CHANGE

What can we do in order to bring about a transition to a more sustainable, self-reliant food system with its accompanying economic and nutritional benefits? There is no single, simple answer to this immense, complex question. Because the Pennsylvania food system is touched by everything from the California food producer, fast-food restaurant, grocery store, food broker and warehouser to the backyard garden and family dinner table and is affected by everything from federal, state and city government policies to business decisions to neighborhood and consumer organizations to individual actions, any thoughtful response has to be on a variety of different levels. There are responses that are appropriate for government decisionmakers, and there are other responses needed from business, from the community, and from individuals.

It is not feasible in this report to trace out all our possible options. What is feasible though, is to point out that: 1) a state plan for our food system is sorely needed which would enable us to increase our self-reliance and economic viability while also decreasing the potential for disruption; and 2) an emergency state plan for feeding Pennsylvanians during a supply disruption is crucial and given the current state of international affairs, national economy and state vulnerability, not to formulate one soon would be irresponsible; and 3) the Pennsylvania consumer can take a more active role in his or her own food system that will make our food system more economical.

This report concludes with The Cornucopia Project's recommendations in these three areas.

1. State plan for Pennsylvania's food system:

A state food plan for Pennsylvania needs to incorporate measures which will realize the following broad policy objectives.

A. INVENTORY, MAP AND PROTECT ALL REMAINING PRIME FARMLAND FROM DEVELOPMENT AND SPECULATION.

The inventory and mapping of Pennsylvania's farmland is a straightforward undertaking, capable of being done relatively easily, quickly and inexpensively by using Pennsylvania's enormous agricultural expertise at either our state land grant college or at other appropriate and interested institutions. Such an inventory would ideally include indentification of all agricultural lands, their potential, current status and likely availability for new farmers or farming ventures.

Preserving our remaining prime farmland by protecting it from development and speculation can and perhaps needs to involve a myriad of state and local policies that cover a spectrum of tax incentives and penalties, inheritance laws and local ordinances.

The Cornucopia Project has an ongoing task force engaged in making a comprehensive inventory of programs that other states, countries or research organizations have either instituted or proposed to deal with similar problems. This listing of options will be sent to anyone wishing a copy. One option that could be used in Pennsylvania is currently used in France, where owners of farmland within designated districts must, by law, notify a state-chartered non-profit corporation of their intention to sell their land. The corporation has the right to buy the farmland within 30 days. Capitalized by the government, these corporations function as revolving funds, reselling the land to farmers who will commit their land to commercial farming. Essentially, the state has "first refusal" rights to all agricultural land sold. Other strategies

include tax changes that modify tax assessments of farmland to reflect current use value, the institution of capital gains tax on land sales and speculation, the establishment of a "circuit breaker" tax which allows farmers to reduce their total tax load when property taxes exceed a certain percentage of their total income (with farmers signing a contract that assures that their land use does not change), the establishment of property tax at the time of sale of farmland that will stay the same until the property is sold again, and the institution of a heavy tax on profits made on the development of previously agricultural land. Yet other options include state or municipality purchase of development rights from farmers (along with the resale or lease with restrictions on use), the establishment of a development permit system, tax incentives for farmland owners to voluntarily restrict development of their prime agricultural lands, state imposed agricultural zoning, voluntary agricultural districting (in use in New York) which provides substantial benefits to farmers, including freedom from being assessed for special services such as water, sewage, drainage, sanitary landfill, etc. and the "right-to-farm" principle, which provides that municipal ordinances may not prohibit normal farming practices. Additional options include the transfer of development rights, cluster development and "agricultural open space preserves" where each municipality would be required to designate an agricultural preserve within its boundaries composed of at least 70 percent of its prime farmland.

B. PRESERVE OUR SOIL BY INSTITUTING WIDESPREAD AND EFFECTIVE SOIL CONSERVATION PROGRAMS WITH STRONG INCENTIVE AND ENFORCEMENT PROVISIONS.

The options in The Cornucopia Project's overall list that could be used in Pennsylvania include tax incentives for soil conserving measures, such as investing in tillage equipment, refraining from Fall plowing and using contour plowing, "conservation achievement contracts" whereby farmers would be provided with annual payments determined by the amount of reduced erosion achieved, taxes on each ton of soil lost from agricultural land, the prohibition of all agricultural production activities which result in more than five tons of soil loss per acre per year, the linking of commodity support programs to soil conservation programs, and the linking of state purchase of farm commodities to soil conservation programs.

C. DEVELOP INCENTIVES FOR FARMERS TO PRODUCE A GREATER DIVERSITY OF CROPS FOR LOCAL CONSUMPTION.

In Pennsylvania, much has already been done in the area of marketing, especially direct farm marketing and the promotion of local agriculture. The system has a broad base of support, particularly in the southeastern part of the state, where farmers' markets have remained viable institutions in the local economy of Pennsylvania Germans. A 1978 USDA study indicated that Pennsylvania had nearly 200 farmers' markets, over 6,000 farmhouse, pick-your-own, and farm store operations, and over 500 roadside stands. The value of products sold directly to consumers totaled $68.6 million.[32] When milk juggers are included, the total becomes $140 million.[33] The Pennsylvania Department of Agriculture also has a promotional program with a logo campaign to identify Pennsylvania products and encourage support for local growers and producers. These programs are good beginnings and need only to be greatly expanded and fine-tuned.

Other options and/or strategies for improving the marketing system to strengthen regional agriculture include "forward contracts," which are agreements regarding delivery and acceptance of a specified commodity at some future date. A mandatory market reporting system would provide information necessary for decision making and identification of market alternatives. Grading standards should be revised to reflect nutritional status, product end uses, maturity and eating quality, rather than external appearances. The establishment of regional warehouses and storage facilities with efficient transport systems to move goods from the farm to the distribution center could be instituted. Public funds could be used to help establish the centers which would then be self-supporting through fees paid by producers. These centers would grade, pack and distribute the output of small local producers and provide large buyers with volumes and specifications they demand.[34] Farmers-Consumer Services Association, Inc. in West Chester, Pennsylvania is an example of such a regional warehouse/market system for local farmers.

The dairy industry already has an extensive marketing system established which makes dairying attractive to farmers since they are assured of both a market and a stable income as a result of the associated support system. Programs set up for other farm products would provide incentives for a more diversified agriculture, and would create stability for smaller-scale operations.

Other options include electronic markets which centralize price negotiation, allow for direct marketing but include the advantages of pricing accuracy normally associated with larger markets, and a forward deliverable contract market which could achieve the benefits of open market trading along with the benefits of contracting. Exclusive agency bargaining, vertical integration through ownership, joint ventures between agricultural cooperatives and agribusiness marketing firms, marketing orders, and marketing boards are all potentially viable alternative marketing strategies as well.[35]

Alternatives for marketing cull cows and dairy calves have also been suggested in a USDA report focused on the Northeast. These include regional auction market centers, regional electronic exchange, a combination regional market center-electronic exchange, and contract sales to packers.[36]

Perhaps one of the most important options that could be implemented relatively quickly is the state purchase of Pennsylvania grown crops. If state institutions, such as hospitals, schools, prisons, etc., all purchased locally grown food products it would provide a good market and incentive for Pennsylvania farmers.

Some other options that might work in Pennsylvania include tax incentives for small scale food producers (such as not taxing the first $10,000 of food produced for local consumption), tax incentives for local direct markets, incentives for attracting food processors to Pennsylvania who wish to reduce transportation costs by locating near a major distribution center, mandating the use of public farmlands for the production of crops for local consumption, instituting a more extensive program promoting and advertising state-grown products (to counter promotional programs of out-of state concerns), developing tax incentives for the purchase of local products by major distribution channels, assisting small growers through a state-wide marketing clearinghouse, developing legislation to enable and encourage institutional purchase of local produce, encouraging expansion of on-farm processing, cooling and fresh packing of local food crops, and developing consumer education programs to increase consumer awareness of locally-grown produce.

D. CONSERVE ENERGY AND NATURAL RESOURCES

Options in this area include developing incentives and methods for using local organic wastes such as leaves, brush, sewage sludge, etc., for fertilizer, developing incentives for water conservation measures, such as investment tax credits for drip irrigation equipment and cisterns, developing incentives for increasing the production of energy from agricultural lands in ways consistent with soil and water conservation principles, providing investment credits for construction of energy conserving barns, greenhouses, etc., and establishing an Agricultural Waste Council in the Pennsylvania Department of Agriculture to develop desirable legislation and other measures to facilitate the recycling of organic wastes.

E. REORIENT STATE AGRICULTURAL RESEARCH TO FOCUS MORE ON SUSTAINABLE FARMING METHODS AND LOCAL FOOD PRODUCTION.

Options in this area include the granting of additional funds to Pennsylvania's land grant university or reorienting existing research funds in these directions.

F. PRESERVE AND STRENGTHEN THE FAMILY FARM.

Ways to do this might include providing guaranteed state loans to beginning farmers with deferred or reduced payments until 5 years after start-up (as is being done in Minnesota), increasing support for direct farmer-to-consumer marketing channels, providing on-farm summer work opportunities for young people interested in learning about farming, developing "entry packages" for new farmers that would include help in obtaining the needed quantities of land, capital, agronomic advice along with managerial/organizational assistance, and developing a consulting program using retired farmers and others who may or may not have been in agriculture (e.g. financial specialists and accountants) to provide assistance to farmers who need managerial advice beyond or different from the capabilities of the USDA service.

G. DEVELOP REGIONAL AND COMMUNITY FOOD PLANS

One possibility here is to borrow a technique currently used in China, where cities are organized around their respective food systems. In this system a city's boundaries will include enough farmland to make the city as self-sufficient as possible. If the city gets more people it expands its jurisdiction over more surrounding farmland to make sure it can feed itself. Other options include establishing incentives for cities and neighborhood organizations to increase local food production, processing and storage with community greenhouses, gardens, orchards, food processing and storage centers, as well as contracting with local farmers to supply their foodstuffs (currently being done in Japan), and revising zoning ordinances to allow more agricultural practices in residential areas. Yet another option in this area would be establishing a state or regional Pennsylvania Food Industry Development Institute or TVA type of organization that could deal comprehensively with a region's food system.

2. Emergency State Food Plan:

An emergency state food plan for Pennsylvania needs to incorporate measures which will deal with the following contingencies:

A. A complete oil cutoff to the United States from all OPEC countries.

B. A multi-year drought in Pennsylvania's present day major food supply areas.

C. A near shutdown for one to four weeks of the U.S. trucking and rail system.

D. A widespread labor dispute in Pennsylvania's present-day major food supply centers that could cut off the flow of food into Pennsylvania.

E. An extraordinary leap in food prices so that only the wealthiest people in Pennsylvania could afford food.

Some options Pennsylvania has for dealing with such contingencies include the establishment of state or regional grain storage facilities, the encouragement of home, community and city storage of basic foodstuffs, the formation within our current Civil Defense organization of state-wide communication and coordination centers for dealing with a food emergency, and the general encouragement, expressed in all the above measures, of producing more and more of Pennsylvania's food within Pennsylvania.

3. Pennsylvania Consumer Activities

There are a wide variety of options available that will help the Pennsylvania consumer deal with the increasing price of food and the vulnerability of our supply.

These options include tax and other incentives for increasing the local production of food by expanding home gardens, producing food in the winter with small scale greenhouses or "growth frames," producing food in the winter in larger greenhouses or "sunspaces" that can be added on to existing houses, producing protein with small-scale fish, rabbit or quail culture, processing and storing more food at home and selectively buying foodstuffs in large quantities when they are in season and then preserving them.

Putting the most appropriate of these measures into practice could greatly increase Pennsylvania's food self-reliance and economic viability, and enhance the nutritional and flavor quality of the food Pennsylvanians consume. Such changes also decrease our vulnerability in times of national and international economic stress, and make Pennsylvania's food system more sustainable. The problems afflicting our food system are real, and they are growing each day. But there are solutions, and we still have the time to make changes. Without changes, the system will crash. With careful planning and action, the abundance we have historically known in Pennsylvania could continue. If Pennsylvania is truly concerned about the condition and future of its food system, then the state must be willing to spend the time and money to develop a realistic plan of action, and then to spend even more time and money to see this plan modified, accepted and implemented. The time to begin is now.

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Pennsylvania Food Imports

AS DETERMINED BY FOOD PRODUCTION AND CONSUMPTION BY WEIGHT AND RETAIL VALUE

COMMODITY	PRODUCTION (Total Fresh & for Processed)			CONSUMPTION							
	Retail Weight[a] (1,000 lbs)	Retail Value[b] ($1,000) (1980 $)	Direct Market[c] $ Value of Sales (1,000)	Consumption in PA[d] (1,000 lbs.)	Retail Value ($1,000) (1980 $)	% Imported	Retail Value of Amount Imported ($1,000)	Amount Exported (% of Production)	Retail Value of Amount Exported ($1,000)	Amount of Land Required to Produce 100% of PA Consumption (Acres)
Meats										
Beef	209,612.16	487,557.88		933,787.6	2,171,990.	77.6	1,685,464.2			9,081,458.5[q]
Veal	16,841.7	50,491.42		18,769.6	56,271.26	10.3	5,795.94			--[r]
Lamb & Mutton	1,656.56	4,065.20		15,250.3	37,424.24	89.1	33,345.0			5,065.
Pork	136,849.79	186,526.26		757,822.6	1,032,912.2	81.9	845,955.09			829,071.
Poultry										
Chicken	380,085.12	272,521.03		607,665.8	435,696.37	37.5	163,386.14			452,132.3
Turkey	68,256.	65,320.99		119,656.2	114,510.98	43.	49,239.72			80,127.
Eggs	502,400.[e]	288,000.		419,969.8	239,382.78			19.6	56,423.54	203,571.
Livestock, Poultry & Products			8,775.17							
Fish	979.8[f]	2,204.55		160,714.7	361,508.07	99.4	359,438.42			9,398.5
Dairy Products			27,042.62							
Cheese	95,617.	238,086.33		192,388.4	479,047.11	50.3	240,960.69			320,647.
Condensed & Evap. Milk	100,598.	65,388.7		51,616.4	33,550.66			48.7	31,844.3	19,098.
Fluid Milk & Cream	8,084,000.	1,823,600.		2,780,247.	628,335.82			65.6	1,196,281.6	463,375.
Ice Cream	286,204.[g]	271,893.8		208,811.8	150,344.49			44.7	121,536.5	88,869.2
Dry Whole & nonfat Milk	18,959.	39,055.54		40,471.95	83,372.22	53.2	44,354.02			62,731.5
Vegetables, Fresh										
Potatoes	600,000.[h]	88,800.	731.57	1,478,106.	218,759.68	59.1	129,286.97			59,124.
Lettuce	1,936.	741.49		315,563.9	120,860.97	99.4	120,135.8			17,212.9
Cabbage	52,400.	11,632.8	194.47	104,405.9	23,178.11	49.	11,357.27			5,800.
Tomatoes	175,120.	123,634.72	679.61	157,195.4	110,979.95			+		13,099.6
Sw. Corn	76,100.	9,132.	2,267.24	85,636.3	10,276.36			+		18,616.6
Snap Beans	23,140.	18,743.4	170.14	16,423.4	13,302.95			+		3,098.75
Onions	6,200.	1,382.6		124,348.6	27,729.74	95.	26,343.25			4,288.
Celery	9,675.	4,353.75		78,597.7	35,368.97	87.7	31,018.58			1,828.
Carrots	8,100.	2,608.2		68,039.8	21,908.82	88.1	19,301.67			2,520.
Sw. Potatoes	448.	112.		64,520.5	16,130.13	99.3	16,017.21			5,040.7
Cucumbers	5,500.	2,695.	163.77	49,270.2	24,142.40	88.2	21,293.6			4,479.
Peas	4,000.	1,920.		--[i]						
Squash	NC[i]	750.[k]	116.13	NC						
Peppers	4,650.	3,385.2	127.11	41,058.5	29,890.59	88.2	26,363.5			4,462.9
Mushrooms	213,790.	254,410.1		31,673.7	37,691.70			85.2	216,757.4	NA[s]
Asparagus	NC		41.94	3,519.3	3,484.11	98.8	3,442.3			1,466.4
Other	2,720.		107.85							NA
Artichokes	NC			2,346.2	1,665.80					NA
Broccoli	6,400.	5,696.		15,250.3	13,572.77	58.	7,872.2			1,906.3
Cauliflower	NC			12,904.1	6,839.17					1,434.
Spinach	NC[i]			5,865.5	4,633.75					938.5
Garlic	NC			9,384.8	7,226.3					782.
Dehydrated Onions	NC			31,673.7	150,450.07					NA
Eggplant	NC			7,038.6	3,448.91					454.
Dry Field Peas	NC			4,692.4	1,830.04					3,420.
Dry Edible Beans	NC			69,212.9	45,680.51					65,111.
Minor Vegs.[i]	NC			44,577.8	26,300.9					NA
Vegetables, Frozen										
Asparagus	NC			1,055.79	2,723.94					932.
Snap Beans	NC			12,082.93	10,995.47					3,789.
Lima Beans	NC			5,865.5	5,396.26					3,371.
Carrots	NC			11,731.0	6,803.98					724.
Peas	NC			18,183.05	12,728.14					6,123.
Broccoli	NC			16,423.4	15,438.0					2,053.
Brussels Sprouts	NC			3,284.68	2,956.21					299.
Spinach	NC			8,798.25	5,454.92					677.
Southern Greens	NC			3,636.61	2,254.70					280.
Cauliflower	NC			5,630.88	5,349.34					626.
Corn	NC			21,819.66	15,273.76					9,816.
Onions	NC			8,446.32	7,094.91					291.
Potato Products	NC			206,113.67	127,790.47					16,489.
Vegetables, Canned										
Asparagus	NC			4,692.4	7,226.30					5,053.
Lima Beans	NC			3,519.3	2,287.55					2,918.
Snap Beans	NC			66,866.7	30,090.02					11,197.
Carrots	NC			5,865.5	2,346.2					290.
Peas	NC			42,231.6	18,117.36					11,424.
Pumpkin Squash	NC			4,692.4	1,529.72					530.
Spinach	NC			8,211.7	4,270.08					597.
Whole Tomatoes	NC			59,828.1	26,204.71					2,533.
Catsup/Paste, etc.	NC			150,156.8	109,614.46					
Tomato Puree	NC			11,731.0	5,278.95					
Tomato & Veg. Juices	NC			35,193.	9,502.11					
Beets	NC			16,423.4	6,175.20					884.
Corn	NC			70,386.0	27,450.54					31,664.
Pickles	NC			98,540.4	98,540.4					4,582.
Sauerkraut	NC			15,250.3	7,106.64					1,350.
Sw. Potatoes	NC			11,731.0	9,032.87					1,184.
Fruits, Fresh										
Apples	505,000.	269,165.	5,875.23	199,427.	106,294.59			61.4	168,874.7	14,292.
Peaches/Nectarines	98,000.	44,100.	2,376.90	64,520.5	31,615.05			32.	14,872.61	8,101.5
Pears	5,600.	3,074.4	305.47	28,154.4	15,456.77	78.	12,056.28			4,048.5
Sw. Cherries	1,900.	1,881.	316.84	7,038.6	6,968.21	68.5	4,773.2			7,351.6
Strawberries	3,300.	3,267.	2,312.72	23,462.0	23,227.38	76.	17,652.81			7,110.
Bananas	0.	0.		241,658.6	77,814.07	100.	77,814.07			NA
Oranges/Citrus	0.	0.		312,044.6[m]	135,115.31	100.	135,115.31			NA
Grapes	111,000.	104,340.	132.47	36,366.1	34,184.13			67.3	70,309.97	7,992.5
Melons	NC		407.81	256,908.9	20,552.71	98.	20,141.66			21,232.
Plums, Prunes	NC		89.33	17,596.5	8,622.29	99.	8,536.06			2,695.5
Other (Fruits & Nuts)			202.43							NA
Sour Cherries	6,300.	3,125.		NC						NA
Fats and Oils										
Butter	38,412.	69,141.6		52,789.5	95,021.1	27.2	25,845.74			185,643.
Lard	40,173.3	27,719.58		25,808.2	17,807.66			35.8	9,923.61	--[t]
Margarine	NC			133,733.4	98,294.05					
Shortening	NC			213,504.2	166,106.26					
Oils	NC			272,159.2	288,488.75	86.2	248,677.3			
Grains										
Wheat	7,561.[n]	1,739.03		1,371,353.9[o]	331,060.55	99.7	329,215.02			978,927.5
Rye	Insignificant			9,384.8	4,692.4	100.	4,692.4			6,982.7
Oats	Insignificant			37,539.2	22,148.13	100.	22,148.13			21,329.1
Barley	Insignificant			14,077.2	8,587.09	100.	8,587.09			5,865.5
Soybeans	28,863. (oil)	39,830.94		NC				100.[u]	39,830.94	NA
Rice	0.			68,039.8	36,605.41	100.	36,605.41			NA
Corn Meal	122,731.64	50,319.97		90,328.7	37,034.77					28,543.9
Corn Cereal	NC			26,981.3	30,758.68					
Corn Syrup, Sugar, Starch	NC			493,875.1	335,835.06					
Processed Fruit Products[p]			117.03	;						
Dried Fruits	NC			29,327.5	58,655.					
Frozen Fruits	NC			132,560.3	159,072.36					
Fruit Juice - Canned	NC			276,851.6	138,425.8					
Canned Fruit	NC			222,889.	156,022.3					
Sugar	0.			1,087,463.7	286,002.95	100.	286,002.95			218,680.[v]
Coffee, Tea, Cocoa	0.			132,560.3	516,985.17	100.	516,985.17			NA
Tree Nuts	NC			20,060.01	50,150.03					--
Peanuts	0.			7,390.53	6,577.57	100.	6,577.57			NA
Maple Syrup	57,000. (gal.)	684.								
Honey	3,034.	3,034.		12,904.1	12,904.1					
Honey & Syrups			238.95							
Edible Syrups				4,692.4	6,100.12	78.6	14,937.32			
		4,946,130.19	52,792.81							
TOTALS	12,056,113.07	4,998,922.99		15,980,320.13	11,571,617.93		5,616,735.05		1,926,655.17	13,469,097.95

About 80 percent of the vegetables consumed in Pennsylvania come from outside the state. Yet Pennsylvania has the climate, necessary soil types, and enough available farmland to be nearly self-sufficient in vegetable production.

Retail Value of Pa. Production $4,998,922,990
Retail Value of Pa. Exports 1,926,655,170
Value of Production remaining $3,072,267,820 = 27% of Consumption in state.

Pa. imports 73% of its food.

a Retail weights for Pa. production are taken directly from 1979 Crop and Livestock Annual Summary or converted using USDA Conversion figures. Production estimates for vegetables not surveyed by the Pa. Crop Reporting Service were supplied by Dr. Pete Ferretti of Penn State; these are the only estimates available.

b Prices were supplied by: U.S. Dept. of Labor, Bureau of Labor Statistics; Mr. R. Keene, USDA Market News Service, Livestock; Schantz Markets, Emmaus; Philadelphia Fresh Fruit and Vegetable Wholesale Market Prices 1979; Foods Naturally, Emmaus; and Fenstermachers, Emmaus,Pa.

c Farmer-to-Consumer Direct Marketing in Six States, July 1980, ESCS, USDA, Ag. Info. Bull. No. 36.

d Consumption in Pa. is based on U.S. per capita consumption figures as they appear in Agricultural Statistics 1979 and Food Consumption, Prices, and Expenditures, USDA Statistical Bulletin No. 656.

e 320,000,000 Dozen.

f Aquaculture: Catfish and Trout, Inventory and Sales 1980. USDA Crop Reporting Board, Statistical Bulletin No. 644.

g 71,551,000 gallons.

h These production figures are generous; they assume no loss or waste between producer and consumer.

i Included in minor vegetables.

j Data Not Collected by USDA, Pa. Dept. of Agriculture, or other agencies.

k Value of squash for processing, Dr. Pete Ferretti.

l Includes peas, kale, lima beans, beets, and brussels sprouts. Price used for retail value is an average of these vegetables.

m Based on average price of oranges, lemons, grapefruit.

n Flour

o Includes wheat flour and cereal.

p Cider, jams, etc.

q Based on acreage requirements of 90% marginal land, i.e. hillsides and land unsuited for crops. Dr. Lowell Wilson, Penn State University.

r Veal is a by-product of the dairy industry, so land area would be included in dairy products.

s Not Applicable

t Lard is a by-product of hog slaughter.

u Pa. has no processing plants, so all soybeans would be exported. Dr. Elwood Hatley, Penn State University.

v Using sugar beets as raw material, with yields of 20 tons/acre.

+ Tomatoes, sweet corn and snap beans are grown for processing as well as fresh market, so any amount over that consumed would be used for processing in Pa.

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